



The bow and the upper railing of the Titanic are shown in this photograph made from the CBS-TV monitor Wednesday. Dr. Robert Ballard, chief scientist of the Woods Hole expedition said on the "CBS

Morning News" Wednesday that a remotely controlled camera yielded vivid color pictures of win bottles, undamaged plates and a small flagpole on the bow on the upright ship.

—AP Laserphoto

Robots help Titanic searchers

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Pulses of sound, bright floodlights and underwater cameras mounted on an advanced undersea robot helped American and French researchers locate the luxury liner Titanic earlier this week.

In the next few days, the deep-sea robot, called Argo, will continue to search the Titanic from stern to stern, sending back tantalizing glimpses to researchers aboard the American parent ship, Knorr.

Sonar equipment on the Argo helped the researchers home in on the Titanic's resting place south of Newfoundland, said Gordon Glass of Woods Hole Oceanographic Institution in Massachusetts.

Sonar uses sound waves to locate underwater objects. Pulses of sound are sent into the water and are reflected back when the sound waves strike a submerged object. The distance to the object is calculated by measuring the number of seconds it takes for the sound to return and multiplying by the speed of sound in water — about 5,000 feet per second.

"What we try to do is go down with a series of sonars — low to high frequencies — closing in on the exact shape and position of the object," Glass said. "Low (frequency) sonars penetrate greater distances, but they don't give a great picture of what's there. Higher frequency sonars don't have the range, but they give a clearer image."

The image that results is "a bunch of black dots" that roughly approximates the shape of the sunken object, Glass said.

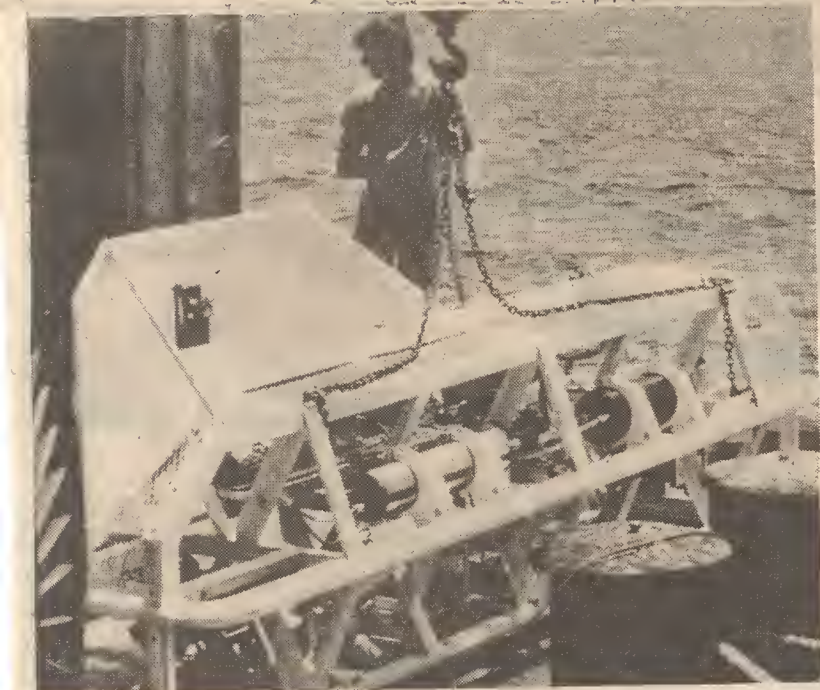
The Argo was about 50 feet from the Titanic when it discovered the wreck, Glass said. Then the Argo's bright searchlights and video cameras were switched on. The first images Argo sent back to the parent ship were of one of the Titanic's boilers, he said.

Unlike manned submersibles the Argo and its robot explorer kin can roam the ocean floor for weeks at a time while many scientists simultaneously monitor data aboard the parent ship. Manned submersibles can take only one or two scientists to a small area of the ocean bottom for a few hours at most.

Sometimes called robot subs, vehicles such as the Argo are not true submarines because they don't move on their own power, said Glass. Instead, they are towed by cable from the parent ship — a rather cumbersome arrangement "like dragging a marble at the end of a string," Glass said.

The cable is hauled up or lowered to change the Argo's depth. To move the Argo forward, the 244-foot parent ship creeps along at a quarter to a half knot (or about a quarter to a half mile per hour), Glass said. To go back the other way, the parent ship makes "huge, sweeping turns," dragging the Argo along beneath it.

Both the Argo and the Angus will continue videotaping and photographing the Titanic for "a couple of days," Glass said. Then they will be hauled aboard the Knorr for their return.



Argo was used to locate and photograph the Titanic.

—AP Laserphoto